A Low-Cost Smart Glove for Hand Functions Evaluation

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ABSTRACT
This paper focuses on the development of a reliable, low cost, average size, light weight, simple, rugged, and compact design five fingers real time smart glove and a measurement hand gripper that emulate the human hand functions that can be used as a prototype model for hand rehabilitation systems for patients suffering from paralyze or contracture. The hand gripper
device will move based on a human operator's finger movement using the smart glove. Index, Middle, ring, and little fingers of the hand have a three degree of freedom, while the thumb finger has a two degree of freedom. All fingers are equipped with sensors for a smooth precise movement on a small scale with a perfect incision and without any vibration. This gripper is ideal for light objects. All the fingers have high speed motion and can be controlled individually and this gives the gripper ability to grasp complex shaped objects this work contains two PIC 18F452 microcontrollers for the instrumentation, communication and controlling applications. A series of flex sensors are built-in a master glove to get readings from the movement of human fingers. Microcontrollers will further use this information to control multiple servos that controls the movement of the slave hand.

KEYWORDS: Glove; Gripper; Hand; Motor; Smart